CLAIMS:

1. A high linearity, low power, low voltage active mixer for RF applications, comprising:

an RF transconductance amplifier to transform the input voltage to current, the transconductance amplifier having a constant transconductance over a wide range of input differential voltages;

a mixing stage to down-convert the RF current to the desired IF;

an ac-coupling stage between the RF transconductance amplifier and the mixing stage; and

an IF stage that converts an information bearing signal back to voltage.

2. A high linearity, low power, low voltage active mixer as in claim 1, wherein the transconductors with constant transconductance result in high linearity in terms of both IIP2 and IIP3.

3. A high linearity, low power, low voltage active mixer as in claim 2, wherein the RF transconductance amplifier consists of:

a floating voltage source;

a capacitive feed-forward path; and

a p-channel and an n-channel single transistor transconductors.

4. A high linearity, low power, low voltage active mixer comprising a transconductor as in claim 3, wherein the body-effect of the transistor transconductance is eliminated to improve the linearity by obviating the threshold-voltage-modulation assisted nonlinearity.

5. A high linearity, low power, low voltage active mixer as in claim 3 comprising a floating voltage source in the RF transconductance amplifier that allows the low voltage operation of the RF transconductor stage.

6. A high linearity, low power, low voltage active mixer as in claim 3, wherein the RF transconductance stage is self-biased and does not require any additional biasing circuitry.

7. A high linearity, low power, low voltage active mixer as in claim 3, wherein the concept of current reuse has been introduced to decrease the power consumption of the design.

8. A high linearity, low power, low voltage active mixer as in claim 1, wherein the ac-coupling between the RF transconductor and the mixing stage blocks the flicker noise associated with the RF transconductor, and hence reduces the total flicker noise at the output, which favors the design for direct conversion applications.

9. A high linearity, low power, low voltage active mixer as in claim 1, wherein the mixing stage is connected to ground through a tuned load, that allows for the low voltage operation of a local oscillator stage.

10. A high linearity, low power, low voltage active mixer as in claim 9, that provides further filtering of the incoming RF signal and the accompanied noise due to the presence of the tuned load in the mixing stage.

11. A high linearity, low power, low voltage active mixer as in claim 1, which shows excellent linearity (IIP2, IIP3) and therefore fits in a direct conversion receiver.

12. An RF transconductance amplifier for use in a high linearity, low power, low voltage active mixer, the RF transconductance amplifier comprising;

a floating voltage source;

a capacitive feed-forward path; and

a p-channel and an n-channel single transistor transconductors.

13. An RF transconductance amplifier as defined in claim 12 wherein the body-effect of the transistor transconductance is eliminated to improve the linearity by obviating the threshold-voltage-modulation assisted nonlinearity.

14. An RF transconductance amplifier as defined in claim 12 wherein the RF transconductance stage is self-biased and does not require any additional biasing circuitry.

15. An RF transconductance amplifier, as defined in claim 12, wherein a floating voltage source causes the transconductor transistors to operate simultaneously in the active region over a wide range of input differential voltages thus resulting in improved linearity in terms of IIP2.

16 A method of improving the linearity of a current commutating active mixer comprising:

transforming the input voltage to current with a transconductance amplifier, the transconductance amplifier having transconductors with constant transconductance over a wide range of differential input voltages;

down-converting the RF current to the desired IF with a mixing stage;

ac-coupling the RF transconductance amplifier and the mixing stage; and converting an information bearing signal back to voltage using an IF stage.